

Suchum, in the same latitude and in a very similar situation as Cannes, in March, 1874, a year with a considerable number of sunspots, there were three days which were more than  $27^{\circ}$  colder than the average, while in March, 1883, with little or no sunspots, the coldest days mentioned by Mr. Williams at Cannes was only  $17^{\circ}3$  colder than the average.

I want only to show by this example that if it is wished to prove anything as to the varying intensity of the sun's rays, a large number of observations in distant countries should be given, especially in middle latitudes, the work of Dové having well proved that there is always a compensation to a certain extent between cold and warm areas, and a very great number of these deviations being certainly due to causes which have nothing to do with anything beyond the earth's atmosphere.

St. Petersburg, April 17

A. WOEIKOF

### Sheet Lightning

LOOKING to the south and south-east from the Bel Alp, the play of silent lightning among the clouds and mountains is sometimes very wonderful. It may be seen palpitating for hours, with a barely appreciable interval between the thrills. Most of those who see it regard it as lightning without thunder—*Blitz ohne Donner, Wetterleuchten*, I have heard it named by German visitors.

The Monte Generoso, overlooking the Lake of Lugano, is about fifty miles from the Bel Alp as the crow flies. The two points are connected by telegraph; and frequently when the *Wetterleuchten*, as seen from the Bel Alp, was in full play I have telegraphed to the proprietor of the Monte Generoso Hotel, and learnt in every instance that our silent lightning coexisted in time with a thunderstorm more or less "terrific" in Upper Italy.

JOHN TYNDALL

I AM glad to find that M. Antoine d'Abbadie's remarks confirm in the main those which I have made on the above subject in NATURE (vol. xxviii. p. 4), especially as to the occurrence of lightning at a great altitude as observed in low latitudes.

In stating that he has frequently observed "thunder without lightning, and lightning without thunder," does M. d'Abbadie mean that, like every one else, he has observed thunder without observing lightning, and lightning without observing thunder? Or have we here a living advocate not only of the dumb lightning, but of the dark (lightningless) thunder?

The thin and local fogs which are not uncommon in thundery weather readily transmit the illumination of a distant flash of lightning. It seems highly probable that in such cases the lightning may be occasionally supposed to be an electric discharge occurring in the fog itself, just as a flickering aurora seen above thin clouds has often been supposed to have its habitat in the clouds themselves.

The suggestion of M. d'Abbadie is a fair one, and I for my part shall be glad to undertake observations of "sheet lightning" this summer in conjunction with any one resident about forty miles from this place, the observers interchanging reports by the earliest post after the hour of observation.

W. CLEMENT LEY

Ashby Parva, Lutterworth, Leicestershire

### Hydrogen Whistles

IN his interesting communication on the above topic (NATURE, vol. xxvii. p. 491) Dr. Francis Galton has inadvertently fallen into a mistake which quite seriously affects the numerical deductions which follow. He erroneously assumes that "the number of vibrations per second caused by whistles is inversely proportional to the specific gravity of the gas that is blown through them."

It is well known that the number of vibrations is inversely proportional to the *square root* of the density or specific gravity of the gas. Hence for hydrogen, as compared with air, the number of vibrations per second produced by a given whistle would be increased only about 3·6-fold instead of 13-fold, as he estimates it. Similarly the number of vibrations by the use of hydrogen in the little whistle when set at 0·14 inches would be only about 86,533, instead of 312,000.

JOHN LE CONTE

Berkeley, Cal., April 12

[THE objection of your correspondent is valid. I am informed independently and by high authority that the velocity of sound in hydrogen must be considered as barely fourfold greater than in air, the number of vibrations per second emitted by a hydrogen whistle being increased in the same proportion.

In making my earlier estimate I had been misled by an erroneous statement in a work that is still of much general credit and authority, to which I referred for ascertaining the velocity of sound in different gases, as it happened to be the book then nearest at hand, and as I have no special knowledge of the subject. It was the first edition of the *Penny Cyclopaedia*, where in the article "Acoustics," p. 95, I lit upon the following passage, which professed to give the precise information I wanted:—"Thus air being about thirteen times as heavy as hydrogen, the velocity of propagation in the latter is about thirteen times that in the former." I need not take up your space by quoting the paragraphs before and after this, which emphasise and corroborate the statement and make it clear that it was no slip of the pen. Possessors of this Cyclopaedia (I know nothing of subsequent editions) would do well to look out the passage and put a note of warning by the side of it.

The fourfold gain, or nearly so, of the hydrogen whistle is not to be despised. It is sufficient to establish its rank as the emitter of the largest number of aerial vibrations per second of any instrument yet contrived. My little whistle, of about 1 mm. bore, requires a very small supply of air, a bag that I fill with a single expiration containing enough to keep it in continuous sound for many minutes. As yet I have not got a portable holder for pure, dry hydrogen, but a well-known chemist is kindly making an experiment of one for me.

FRANCIS GALTON]

### The Pillar of Light

I HAVE frequently observed this phenomenon. The first time I saw it was on April 8, 1852, when I saw it here at sunset, and on April 11 I saw it at sunrise when I was in the Irish Channel, near to Port Patrick, where I was laying a submarine cable.

In the *Monthly Notices* of the R.A.S. vol. xii. p. 185, there are several notices of its having been seen at that time in various places. I saw it last on April 6 this year, when it had the same appearance as previously, which is well represented by Mr. Symond's drawing on p. 7, except that the lower part is too bright, and it looks more correct when shaded with a pencil. The pillar is always perpendicular to the horizon and to the sun's position. I saw the zodiacal light several times in February, extending as far as the Pleiades, and at an angle of about  $45^{\circ}$ . I think it is highly probable that the pillar of light is caused by reflection from ice crystals, as we had very cold weather early in April, and have still. These atmospheric phenomena are often best seen reflected from a plate glass window.

Gateshead, May 9

R. S. NEWALL

### Remarkable Lunar Phenomenon observed at Weston-super-Mare, August 21, 1861

AT about 8.30 p.m. a band of silvery light appeared proceeding from the lower margin of the moon, in a line perpendicular to the horizon. The width of this band was equal to the exact apparent diameter of the moon's disk. Slowly the band lengthened, until its upper portion reached beyond the moon to the extent of about two diameters, while the lower limb extended itself to about the length of four diameters, where its foot rested apparently on a light fleecy cloud. In a few minutes a similar band traversed the other at right angles, forming a perfect Latin cross, the brilliant face of the moon occupying the place of intersection. The arms of the cross were respectively about two diameters of the moon's face. The portion of the sky in which this occurred was clear, but clouds were slowly drifting from the west, and in ten minutes began to obscure this beautiful and unusual phenomenon.

The only record of any similar phenomenon which I can meet with is to be found in Lowe's treatise on atmospheric phenomena, wherein two instances are described. The observer of one was Dr. Armstrong, and the appearance was seen by him at South Lambeth on February 25, 1842. The other observer was Mr. Lowe himself, who was at Derby railway station when the phenomenon occurred. In both these instances, however, the crossbeam was absent. Although no hypothesis has been suggested to account for this appearance, it may be interesting to note that in the case recorded by Mr. Lowe, the very

hour of its occurrence is identical with that of the appearance of the phenomenon seen by me, and the day of the month so closely approximates as to be only one day later. That which Dr. Armstrong saw in 1842 was at the time of the full moon in February.

C. POOLEY

#### Curious Habit of a Brazilian Moth

AT the last meeting of the Literary and Philosophical Society of Liverpool (April 30) I read the following note on a remarkable habit of a Brazilian moth; and as it is a habit that has perhaps not been observed before, it may be of sufficient interest for insertion in NATURE.

The moth (of which I inclose a sketch) is a species of *Panthera* (*P. Apardalaria*).

When rambling about the rocky beds of small streams on the Serra da Contareira, near San Paulo, I have often been struck by the great numbers of yellow and black moths that flew up from the water as I disturbed them by my presence. On careful examination I found that these moths were resting upon the wet stones, in many cases even with a film of water flowing over the spot on which they had settled, and were all engaged in sucking up the water through the proboscis (I can hardly call it drinking, for no imaginable thirst could account for the enormous amount of water sucked up), and this water was passing through the moths, minute drops forming on the tip of the abdomen, and falling off as formed. I timed several specimens, and found that the average rate was fifty drops per minute. I have observed the same individual remain in the same position with the action going on unceasingly for three hours; and in all probability had been there some time before I observed it, and remained after I went away. But even in this length of time the quantity of water passing through the moth was enormous in proportion to its size. The drops I did not actually measure, but they are probably between 1 and 2 millimetres in diameter. Taking them to be 1·5 millimetres in diameter, the total amount of water in the three hours was 15·84 cubic centimetres, or almost exactly a cubic inch. This quantity is equal to about 200 times the volume of the body of the moth!

The tibiae of the hindlegs are very thick and are armed with long hairs, that by their capillary action prevent the moth being immersed in the water. I have often seen one of them knocked down by a little spurt of water splashing over the stone on which it was standing, and it recovered itself immediately without being wetted in the least.

Upon my return to Brazil I shall try to measure exactly the amount of water passing through one of these moths. And it would be most interesting to find out what is the object of this excessive drinking. Can it be that the moth extracts nourishment from minute particles of organic matter contained in the water?

I may remark that the water of the streams where I have observed the moth is very clear and pure.

E. DUKINFIELD JONES

Acrefield, Woolton, Liverpool, May 5

#### Leaves and their Environment

I TAKE the following from an experiment which I made two years ago. I think it throws some light on the point under discussion:—

On May 8 six young pea plants, similar in size, &c., were transplanted from the garden into three large flowerpots, a pair in each, and were covered with bell glasses. On next day an apparatus for generating a constant stream of carbonic acid gas was connected to No. 1 bell glass. No. 2 was left normal. No. 3 inclosed a small disk of caustic potash solution. They all had as nearly as possible the same amount of sunlight, and the same measured quantity of water was given to each.

Taking the notes referring to the leaves only I find on May 21: "No. 1, vigorous large leaves. No. 2, much smaller leaves. No. 3, leaves smaller than No. 2, with edges serrated as if the veins were growing on, but could not find food for fleshy part of leaf—really a starved plant."

On May 27 the plants were taken up and washed, when No. 1 weighed 148 grains; No. 2, 115·5 grains; and No. 3, 87 grains. After drying, the weights of Nos. 1 and 3 were as 19 to 13. The longest leaf on No. 1 measured 1 $\frac{5}{8}$  in., and on No. 3 1 $\frac{1}{8}$  in.

J. BROWN

Belfast, May 3

#### Foam Balls

IN NATURE, vol. xxvii. p. 531, there is a mention by Mr. J. Rand Capron of foam ball. These are common on the coast of the Northern United States, especially of a cold dry day, when, if there be much wind, these huge foam balls, which may reach a diameter of two feet or more, are rolled up the beach. Their weight soon changes their form, so that at last they present the appearance of long white rolls of sparkling foam. This singular appearance was first described in verse, so far as I know, by Dr. S. Weir Mitchell, of Philadelphia. The verse, as I recall it—I quote from memory—is this:—

"And wilder yet when of a winter day  
The cold dry norther rolls athwart the beach  
The gleaming foam balls into serpents white,  
And all the sand is starred with rainbow light."

Philadelphia, U.S.

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#### ANTHROPOLOGY<sup>1</sup>

##### II.

**I**N considering the claims of anthropology as a practical means of understanding ourselves, our own thoughts and ways, we have to form an opinion how the ideas and arts of any people are to be accounted for as developed from preceding stages. To work out the lines along which the process of organisation has actually moved, is a task needing caution and reserve. A tribe may have some art which plainly shows progress from a ruder state of things, and yet it may be wrong to suppose this development to have taken place among themselves—it may be an item of higher culture that they have learnt from sight of a more advanced nation. Our own history shows to how small an extent we have been the developers of our own arts and sciences, how largely we have embodied the culture of other nations. It is essential in studying even savage and barbaric culture, to allow for borrowing, so as to clear the lines of real development. When the savage comes into contact with the civilised man, he does not see his way to copy all the high contrivances of this mysterious higher being, but where he thinks he can imitate, he is apt to try, and sometimes succeeds, though oftener fails. After a time of friendly intercourse, the wild man generally learns such substantial secrets of culture as he is in a position to assimilate. Ethnologists have been inclined to look on the wandering Esquimaux of the polar regions as "nature-men," and perhaps no harm has arisen from reasoning on them as such, for they are in many ways fair representatives of the rude nomad hunter and fisher. But I suspect that in some respects they do not show the mere result of the primitive savage working out by slow degrees a somewhat higher culture. Looking at them not as they are now, Europeanised under missionary training, but as they were when Egede and Cranz went out to them from Denmark in the eighteenth century, it seems that their way of life even then had some incidents above the savage level. Their clothing was artistically contrived to resist the intense cold. Its material is sometimes strange to our notions; an undershirt of birds' skins with the feathers inside requires an effort to realise even in our bleakest season. But a leather tunic with sleeves and a hood to pull over the head, a pair of sealskin breeches with leather stockings and boots, form a defence against the cold, at once like that familiar to Europeans, and unlike any unquestionable savage costume, such as the furs which in the Antarctic regions the shivering Fuegians throw over their shoulders. Moreover, all across the polar coast region of the Esquimaux their houses of earth or moulded snow, with compartments like ship-cabins, are warmed and lighted with blubber, burnt in lamps shaped out of pot-stone with moss to serve as wick, and over these are hung the potstone kettles for their slight cookery. Now,

<sup>1</sup> Two lectures on "Anthropology," delivered on February 15 and 21 at the University Museum, Oxford, by E. B. Tylor, D.C.L., F.R.S. Continued from p. II.